



OLJE- OG ENERGIDEPARTEMENTET

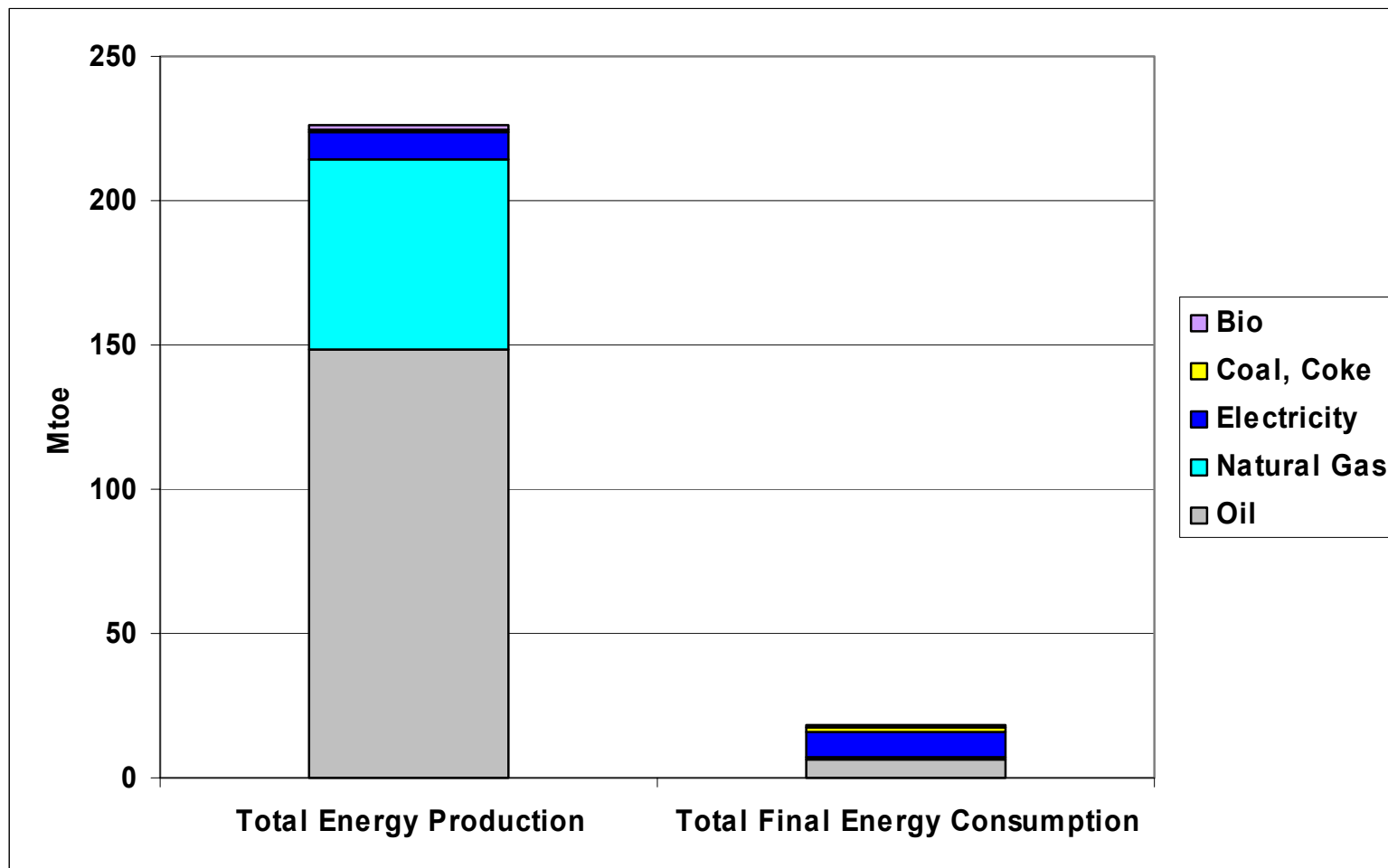
Ministry of Petroleum and Energy

CO₂ Sequestration - the case of Sleipner

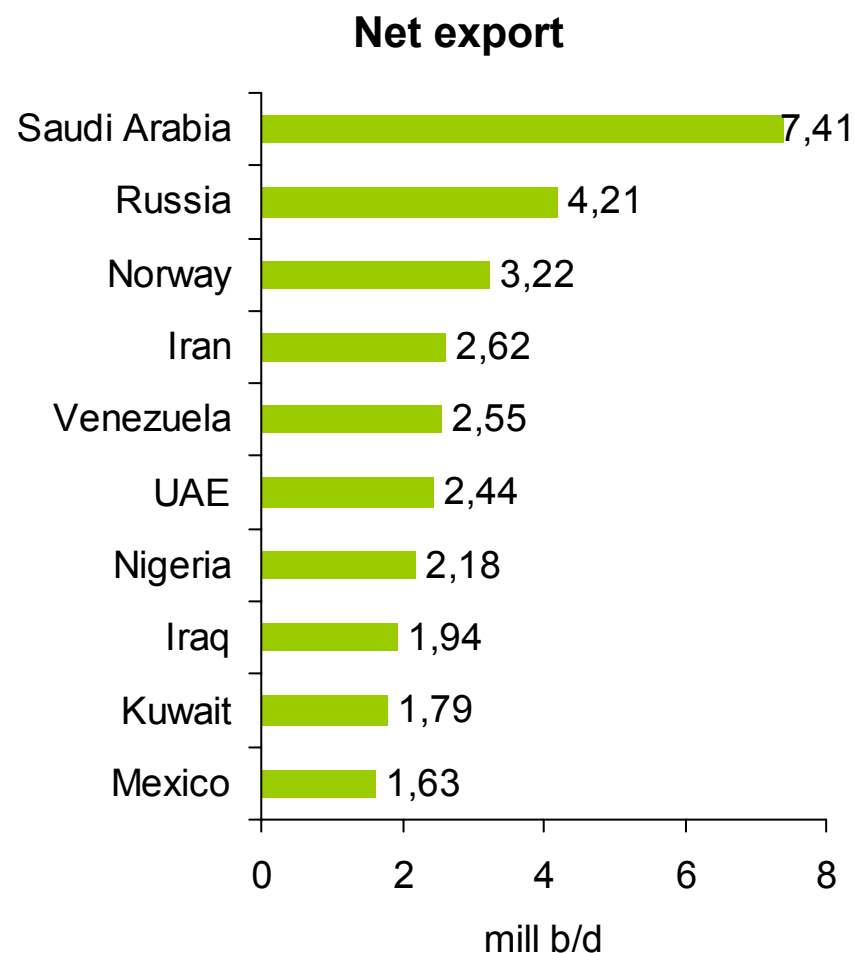
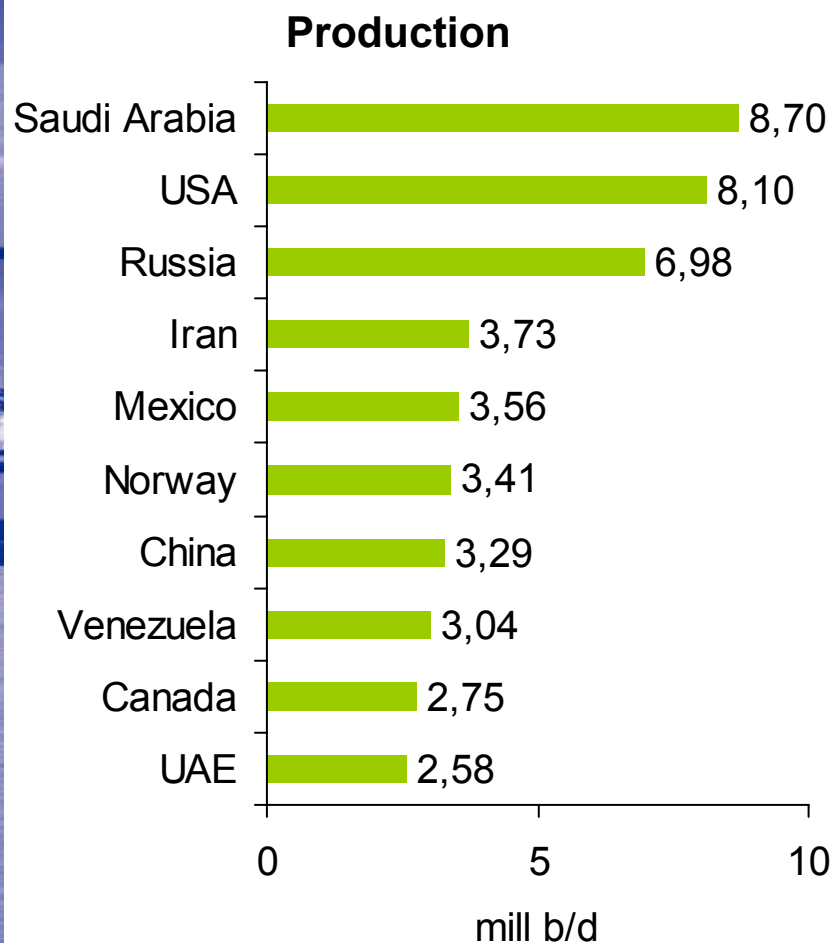
Inaugural Meeting of the
Carbon Sequestration Leadership Forum
Tyson's Corner, Virginia
24 June 2003

*Odd Sverre Haraldsen
Deputy Director General
Ministry of Petroleum and Energy, Norway*

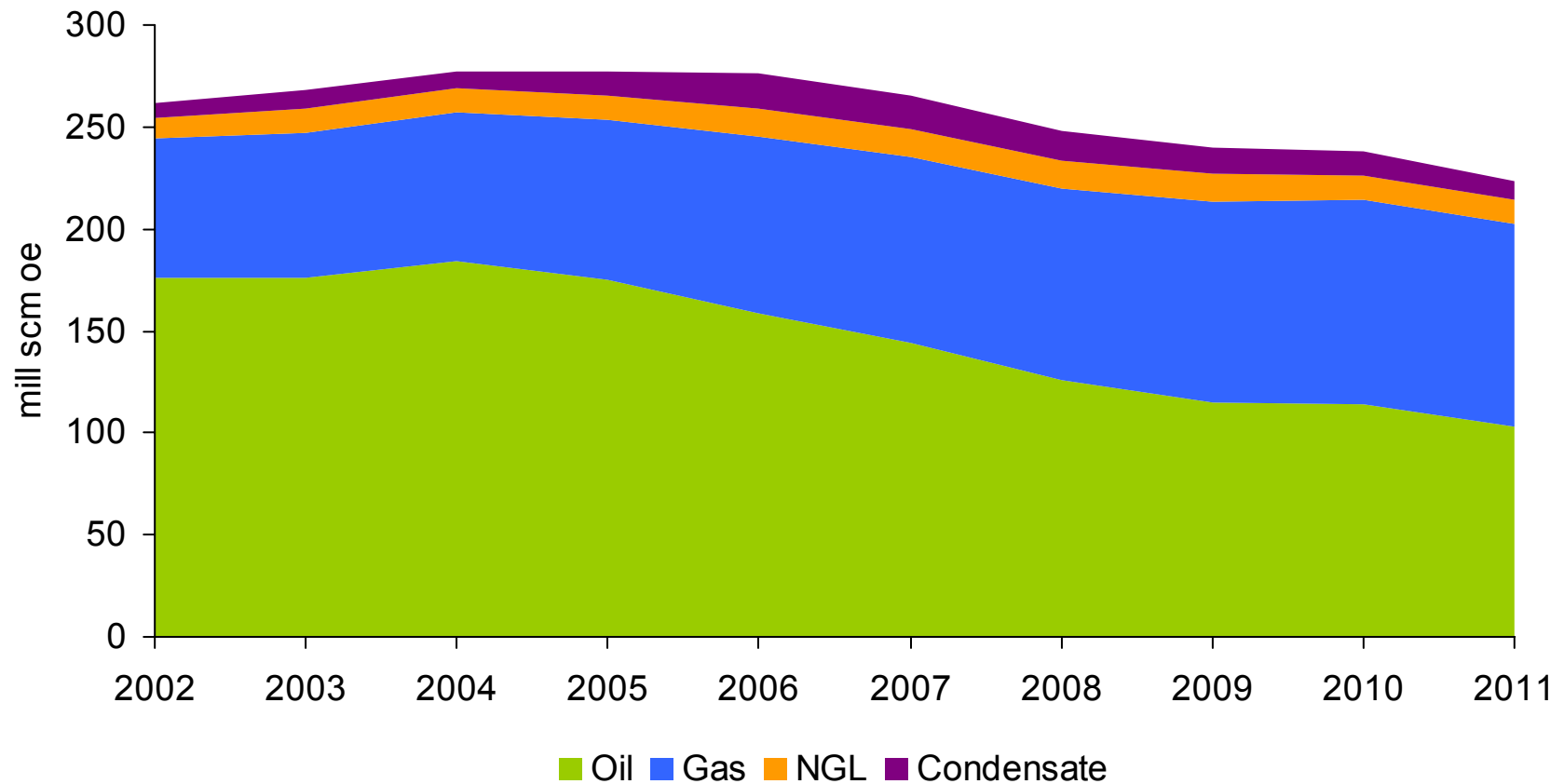
Total Energy Production & Final Consumption



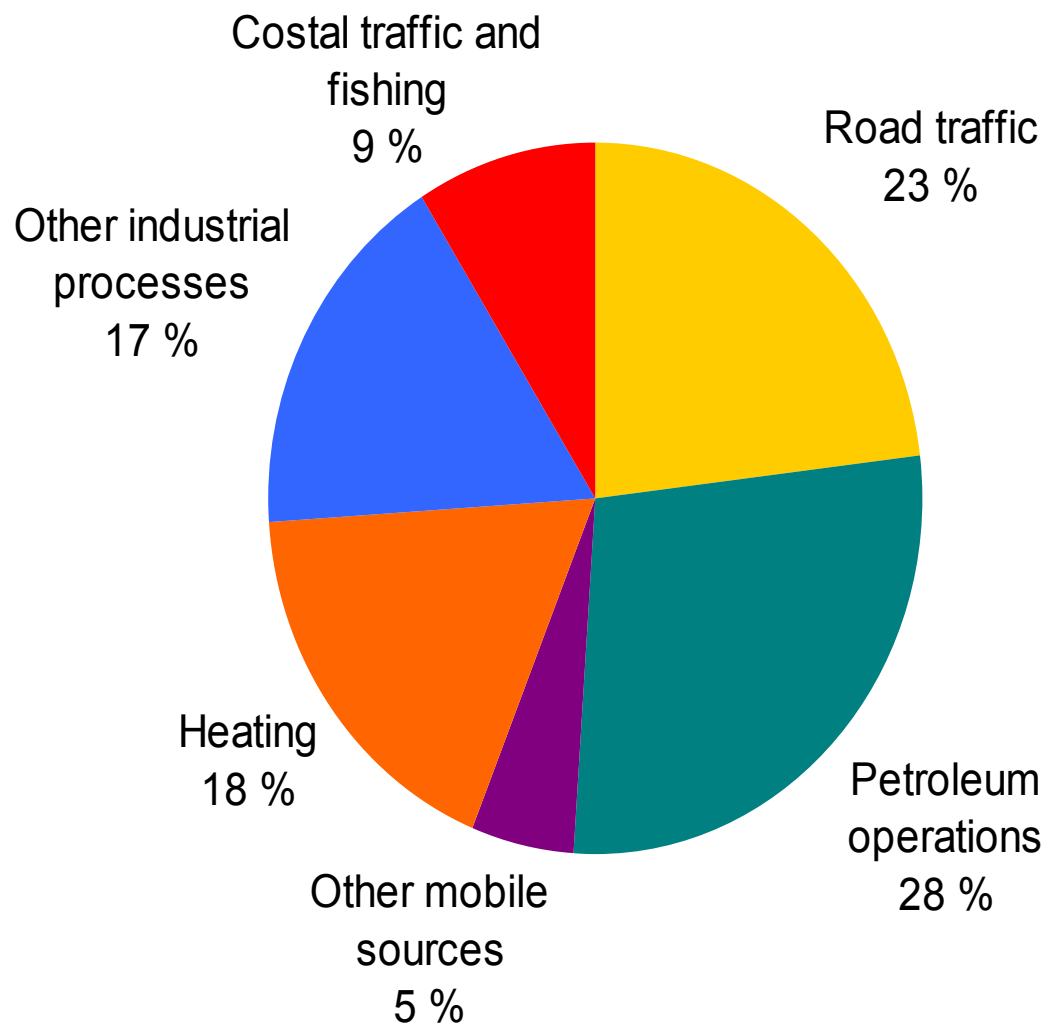
Production and net export of crude oil in 2001 incl. NGL



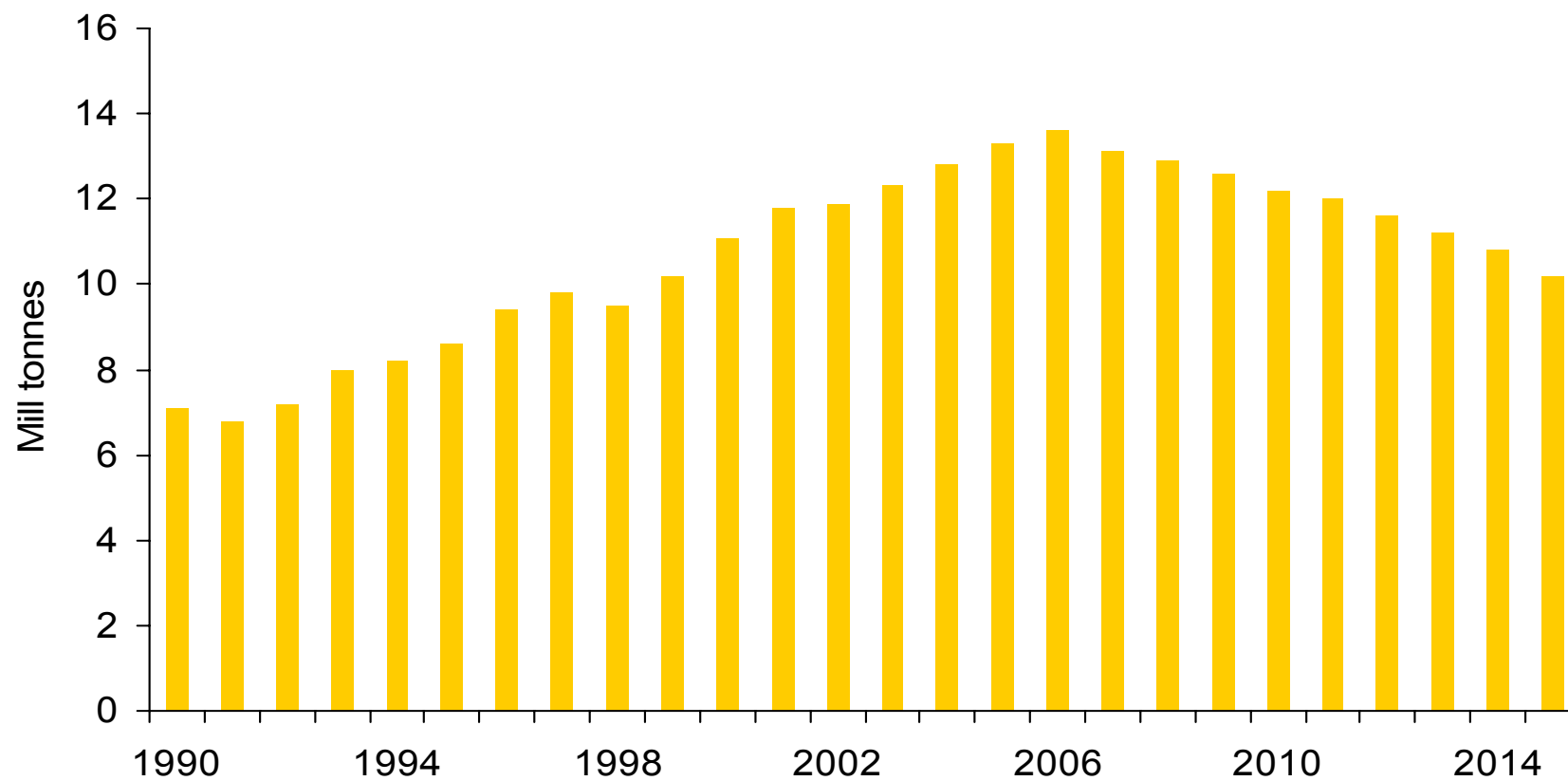
Production forecast for petroleum



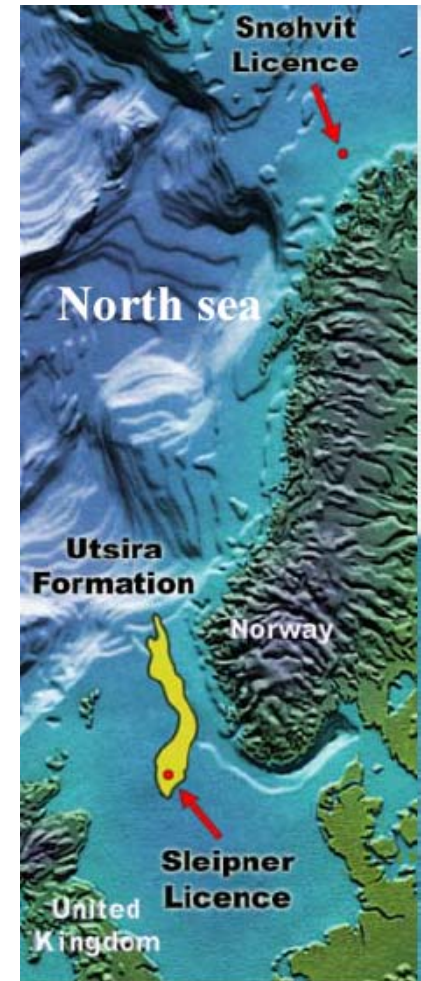
Sources of Norwegian CO₂ emissions, 2001



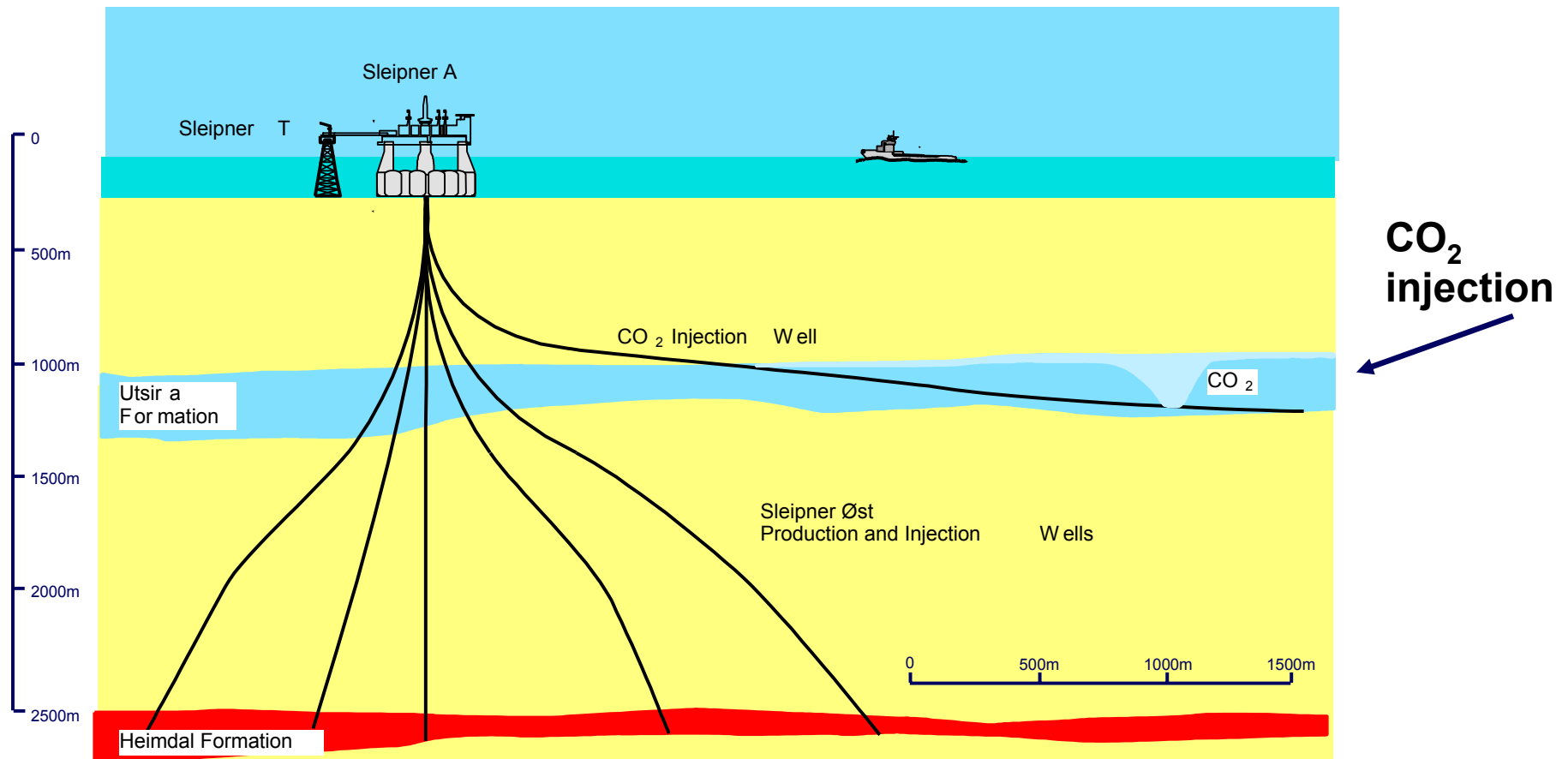
Total emissions of CO₂ from the Norwegian petroleum sector



The Sleipner CO₂ Injection



Sleipner Saline Aquifer CO₂ Storage Pilot



Saline Aquifer CO2 Storage project SACS

Statoil
BP
ExxonMobil
TotalFinaElf
Norsk Hydro
Vattenfall

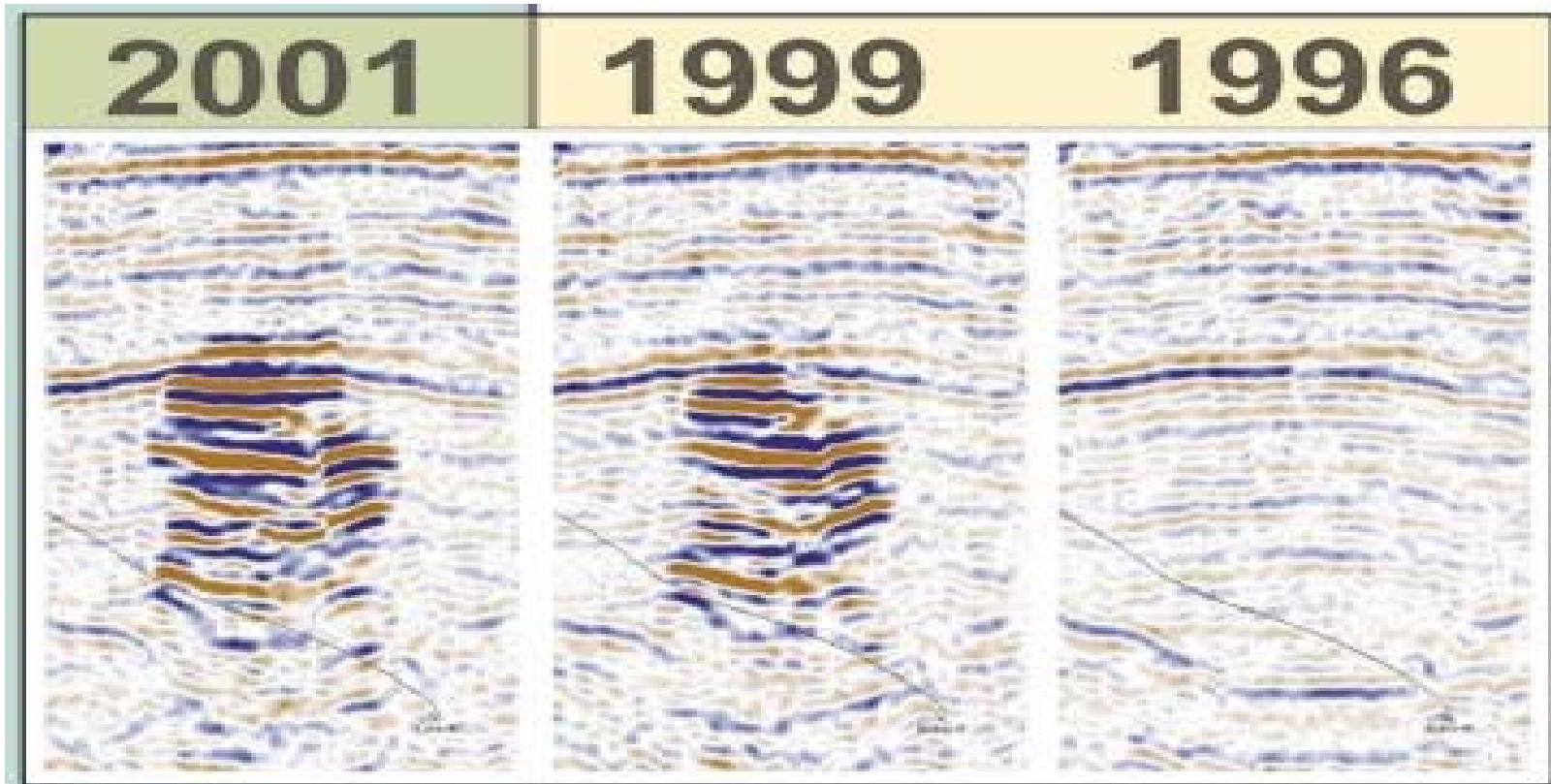


BGS
BRGM
GEUS
IFP
NITG-TNO
SINTEF



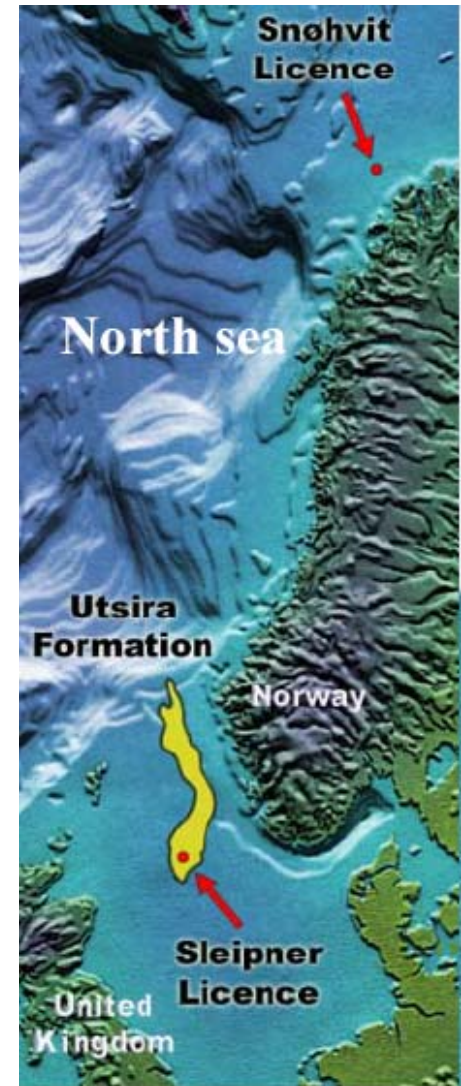
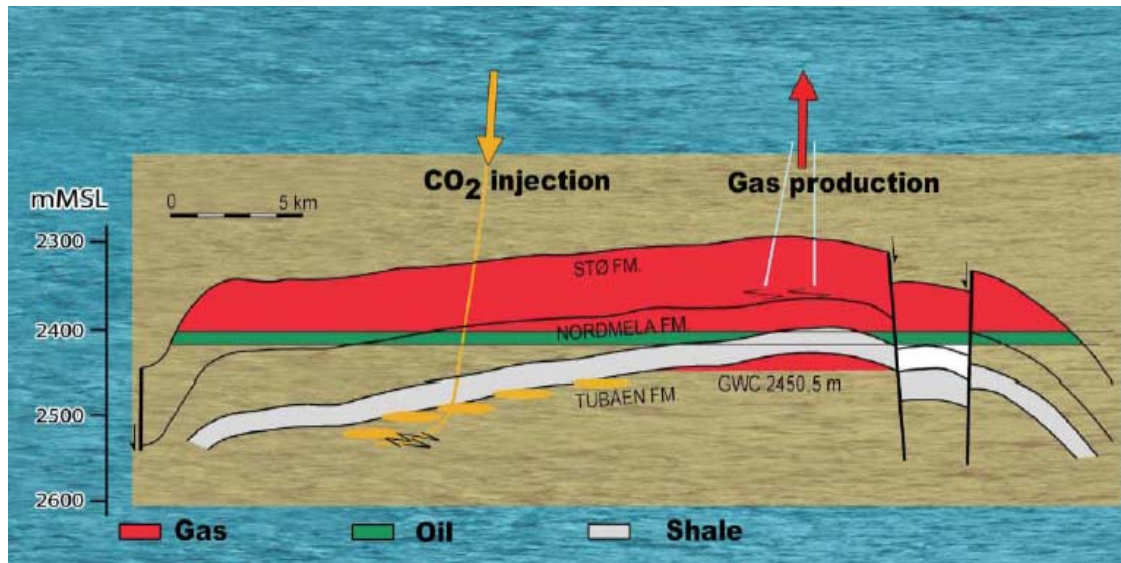
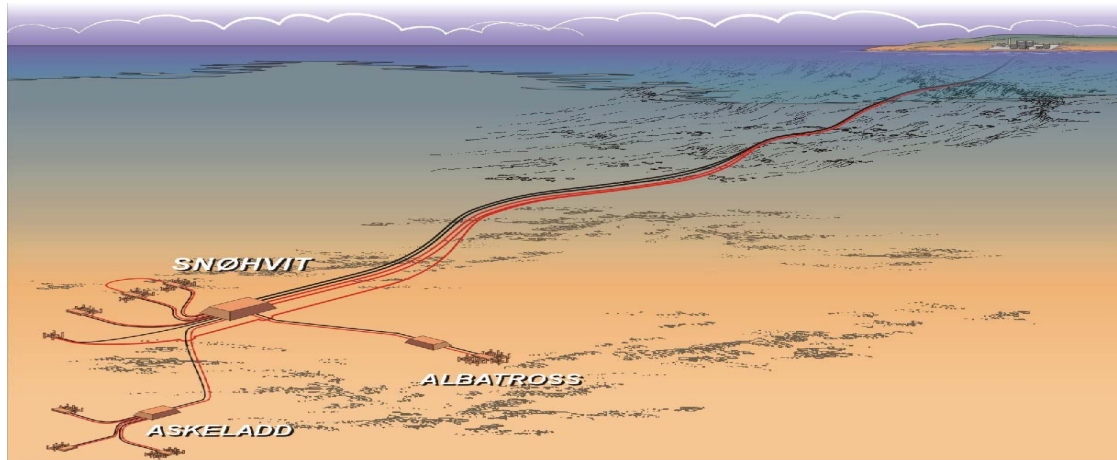
IEA Greenhouse Gas R&D Programme
Schlumberger Research
N, Dk, NI, Fr & Uk Authorities

SACS - Results



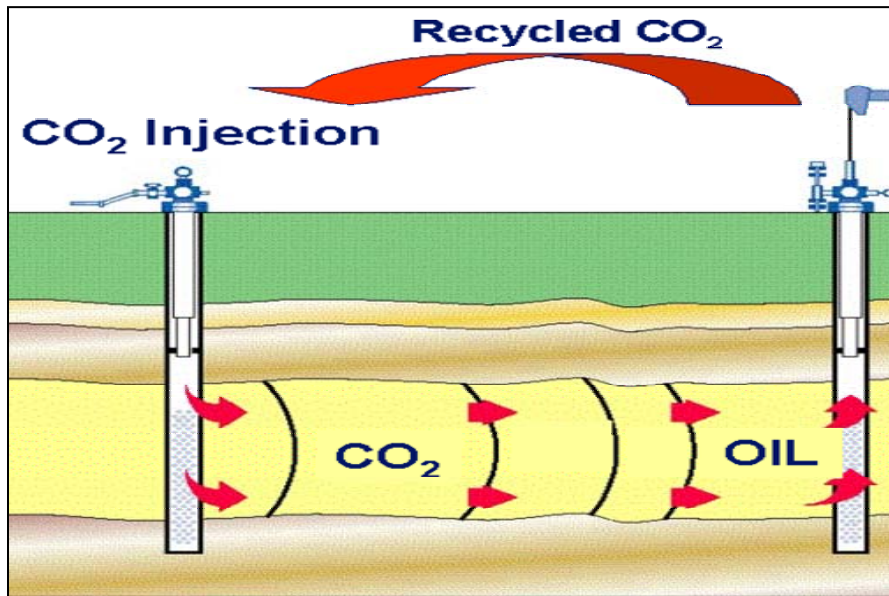
**Bright seismic reflections
indicate thin layers of CO₂**

The Snøhvit CO₂ Injection

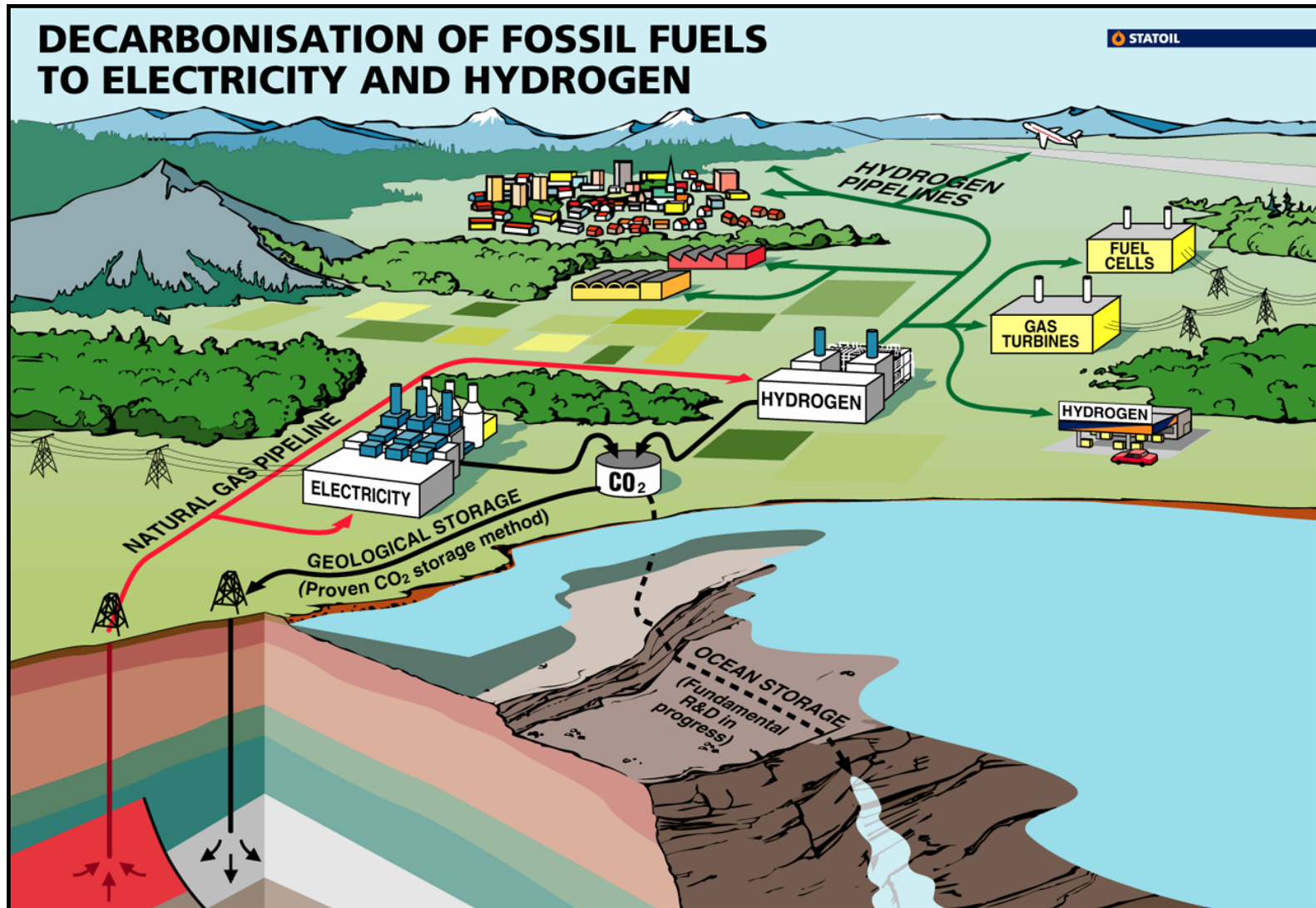


CO₂ for EOR

- Not yet mature in the North Sea
- Potential for enhanced recovery of oil on the NCS is significant
- The Gullfaks may be a first test case



Carbon Sequestration and Hydrogen



Core Projects within CO₂ Capture, Transport and Storage Ongoing in Norway

- **CCP- CO₂ Capture Project, 9 oil companies, US DoE, 2001-2003**
- **SINTEF/NTNU/UiO, basic R&D, 2001-2005**
 - ✓ **Strategic Institute Programme (SIP) on CO₂ capture**
 - ✓ **SIP on transport and storage**
- **Institute of Energy Technology/CMR, Calcium carbonate, 2001-2005**
- **Norsk Hydro, Alstom and others, AZEP (membrane in gas turbine)**
- **Navion, Statoil, transport of CO₂ by ships, 2002-2003**
- **Kvaerner Process Systems, membrane absorber technology (amine), 1992-2005**
- **CO₂-capture from natural gas (Sleipner etc.), 1990-2002**
- **Snøhvit , CO₂ capture and storage (to come)**
- **Statoil CO₂ demonstration for power plant (to come)**

Conclusions

- Norway will continue to pursue carbon sequestration as a main option to control national CO₂ emissions
- The experience gained from ongoing CO₂ injection is vital to build a knowledge base for carbon sequestration
- Documentation from the Sleipner SACS project so far indicate the CO₂ stays within a well defined accumulation
- Enhanced oil recovery has a long term potential
- Broader international collaboration would strengthen the future case of carbon sequestration

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